powder from the surface of the identified particles such that ferrosilicon powder particles may be recovered.

It is noted that in the method for separation, the identifier may also be a human that identifies the particles to be separated and marks them with a marker.

In view of the above, in accordance with a first aspect, there is provided a separation apparatus, comprising: an identifier arranged to identify the particles in a group of particles that have a specific property; an affinity modifier arranged to modify an affinity of the identified particles relative to that affinity of non-identified particles in an group; a separator arranged to separate the particles in the group based on their difference in the affinity; wherein: the affinity modifier modifies the affinity of the identified particles by applying affinity modifying particles to the identified particles; and the affinity modifying particles comprise liquid droplets to moisturize the identified particles to form a moisture bridge between the identified particles and the separator.

In accordance with a second aspect, there is provided a method for separation of particles from a group of particles, comprising the steps of: supplying an group of particles in an arrangement, wherein the group of particles comprises particles with different properties; identifying particles in the group of particles that have a specific property; modifying an affinity of the identified particles relative to that affinity of non-identified particles in the group with an affinity modifier; separating the particles in the group based on their difference in the affinity with a separator; wherein: the affinity modifier modifies the affinity of the identified particles by applying affinity modifying particles to the identified particles; and the affinity modifying particles comprise liquid droplets to moisturize the identified particles to form a moisture bridge between the identified particles and the separator.

The invention will be further elucidated on the basis of an exemplary embodiment which is represented in a drawing. In the drawings:

Fig. 1 shows a first schematic view of the separation apparatus.

Fig. 2 shows a second schematic view of the separation apparatus.

It is noted that the figures are merely schematic representations of a preferred embodiment of the invention, which is given here by way of non-limiting exemplary embodiment. In the description, the same or similar part and elements have the same or similar reference signs.

In Fig. 1 is shown a separation apparatus 1 comprising an identifier 2 arranged to identify the particles 3 in a group of particles 4 that have a specific property. Fig. 2 shows the separation apparatus 1 comprising optional further elements.

The separation apparatus 1 is arranged for individual engagement of particles. The particles may be small particles such as shredded PE, PP or PET of different colors or different grades with a diameter size that may range between 1-20 mm. An affinity modifier 5 is provided that is arranged to selectively modify an affinity of the identified particles 3 relative to that affinity of non-identified particles 6 in a group 4, and a separator 7 is arranged to separate the particles in the group 4 based on their difference in the affinity. The specific property that is measured by the identifier 2 may be, e.g. a type of material, weight, color, shape and/or size.

The sensor separation apparatus 1 in the example further comprise a layerizer 8 arranged to bring the group of particles 4 in layer, and preferably provides the particles 4 in the layer with a known constant

spatial relation in the layer between the identifier 2 and the affinity modifier 5. Worded differently, the particles 4 are by the layerizer 8 provided such that the travel time from the identifier 2 and the affinity modifier 5 is known. This allows operation of the identifier 2 and the affinity modifier 5 to be synchronized.

The layerizer 8 in this embodiment comprises a conveyor belt surface 8A on which the particles are deposited in a planar layer. The conveyor belt surface 8A preferably has a high-friction surface, for example comprising synthetic and/or natural rubber. As shown in Fig.1 the group particles 4 are being fed onto the conveyor belt surface 8A by a feeder 9. The group particles 4 may be fed onto the conveyor belt as a continuous curtain of particles or as sections with a predetermined distance. Optionally, the group particles 4 first passes magnetic scrap remover 15 for removing particles in the particle feed having magnetic properties. The magnetic scrap remover may comprise a magnet 20 for attracting particles having magnetic properties, like particles comprising ferromagnetic metal. Particles comprising ferromagnetic metal may comprise such ferromagnetic metal in a pure form or in a compound, like a salt or other.

The identifier 2 is in Fig. 1 embodied as an optical sensor 10 wherein it is positioned above the layerizer 8 to identify the group particles 4 that have a specific property. For example, the identifier 2 is arranged to identify the color of the particles 4 in a stream of clear and in particular translucent particles. The identifier 2 is also arranged to identify a specific type of PP via a marker provided in the PP material. Furthermore, the identifier 2 is arranged to identify the position of the particles on the conveyor belt surface 8A.

After the particles 4 have passed along the identifier 2, the affinity modifier 5 modifies the affinity of the identified particles 3 by applying affinity modifying particles 11 to the identified particles 3. The modifying particles 11 is, for example discharged from above the conveyor

Claims

1. A separation apparatus, comprising:

- an identifier arranged to identify the particles in a group of particles that have a specific property;

- an affinity modifier arranged to modify an affinity of the identified particles relative to that affinity of non-identified particles in an group;

- a separator arranged to separate the particles in the group based on their difference in the affinity;

wherein:

- the affinity modifier modifies the affinity of the identified particles by applying affinity modifying particles to the identified particles; and

- the affinity modifying particles comprise liquid droplets to moisturize the identified particles to form a moisture bridge between the identified particles and the separator.

2. Apparatus according to claim 1, wherein the affinity modifying particles comprise water droplets.

3. Apparatus according to claim 1 or 2, further comprising a layerizer arranged to bring the group of particles in layer.

4. Apparatus according to claim 2 or 3, wherein the layerizer provides the particles in the layer with a known, preferably constant, spatial relation in the layer between the identifier and the affinity modifier.

5. Apparatus according to any one of the claims 2 to 4, wherein the layerizer comprises a conveyor belt surface on which the particles are deposited in a planar layer.

6. Apparatus according to any one of the preceding claims, wherein the identifier is an optical sensor.

7. Apparatus according claim 1, wherein the affinity modifying particles form a coating surface layer onto the identified particles.

8. Apparatus according to any one of the claims 6 or 7, wherein the affinity modifying particles further comprise powder particles.

9. Apparatus according to claim 8, wherein the powder particles comprise magnetic powder particles, preferably spherically shaped.

10. Apparatus according to claim 9, wherein the powder particles comprise industrial ferrosilicon.

11. Apparatus according to any one of the preceding claims, wherein the affinity modifier comprises a printer head.

12. Apparatus according to any one of the preceding claims, wherein the specific property is a type of material, color, shape and/or size.

13. Apparatus according to any one of the preceding claims, wherein the separator has a contact surface onto which identified particles are affixed thereon.

14. Apparatus according to claim 13, wherein the contact surface is coated with hydrophilic fibrous material.

15. Apparatus according to claim 13, wherein the contact surface comprises a magnet or at least is coated with a magnetizable layer.

16. Apparatus according to any one of the preceding claims, wherein the separator comprises a mechanical pick up device having a contact surface that contacts the group of particles for picking up the identified particles.

17. Apparatus according to any one of the preceding claims, wherein the separator comprises a drum.

18. Apparatus according to any one of the preceding claims, wherein the group of particles comprises small particles with a diameter size of 1-20 mm.

19. Method for separation of particles from a group of particles, comprising the steps of:

- supplying an group of particles in an arrangement, wherein the group of particles comprises particles with different properties;

- identify particles in the group of particles that have a specific property;

- modify an affinity of the identified particles relative to that affinity of non-identified particles in the group with an affinity modifier;

- separate the particles in the group based on their difference in the affinity with a separator;

wherein:

- the affinity modifier modifies the affinity of the identified particles by applying affinity modifying particles to the identified particles; and

- the affinity modifying particles comprise liquid droplets to moisturize the identified particles to form a moisture bridge between the identified particles and the separator.

20. Method according to claim 19, wherein the different properties are material, color, shape and/or size.